

Reconstructing The Concept Of Self Actualisation In Artificial Intelligence Based Learning : An Integrative Literature Review

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ABSTRACT

The development of Generative Artificial Intelligence (GenAI) has transformed the learning ecology by positioning AI as a cognitive partner that supports personalisation, feedback, problem-solving, and creativity. This transformation necessitates a reconstruction of the concept of self-actualisation, as some human cognitive activities can be delegated to AI. This study aims to analyse the transformation of self actualisation, identify the conditions that strengthen or hinder it, and formulate a conceptual framework for self-actualisation in AI-based learning. This study employs a qualitative library research approach using an integrative literature review design. The findings indicate that GenAI is paradoxical in nature: it can serve as a cognitive scaffold that strengthens autonomy, competence, self-regulation, creativity, metacognition, and epistemic agency, while also potentially encouraging cognitive offloading, dependence, and the weakening of cognitive autonomy. This study proposes the Reflective-Relational Self Actualisation Framework in AI Learning Ecologies (RRSA-AILE), which encompasses autonomy, competence, relatedness, epistemic agency, metacognitive reflexivity, generative creativity, and ethical responsibility. Theoretically, RRSA-AILE integrates humanism, Self-Determination Theory, Self-Regulated Learning, and learner agency. Practically, the framework provides a foundation for AI-enhanced learning that is augmentative, reflective, and centred on human agency.

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1. INTRODUCTION

The development of artificial intelligence, particularly Generative Artificial Intelligence (GenAI), marks a significant epistemological shift in education. AI technologies are no longer used merely as administrative tools or media for delivering information; rather, they are increasingly functioning as interactive partners capable of generating explanations, providing feedback, personalising learning materials, assisting with problem-solving, and supporting learners' creative activities. In this context, learners' relationship with knowledge is undergoing a transformation: learners engage not only with teachers, books, and social environments as sources of learning, but also with algorithmic systems capable of responding rapidly and individually to their cognitive

needs. Research indicates that AI based personalised learning has the potential to enhance autonomy, engagement, and academic performance (Ellikkal & Rajamohan, 2024), while the use of ChatGPT has also been associated with learners' experiences of autonomy and independent learning (Annamalai & Nasor, 2025).

This transformation raises fundamental questions about the aims of education. If AI is increasingly capable of performing activities previously associated with human intellectual capacities, such as writing, explaining, analysing, constructing arguments, and generating ideas, education cannot adequately be oriented solely towards the acquisition of information and instrumental skills. Education needs to reconsider how technology can be situated within the process of human becoming, that is, the process through which learners develop the capacity to recognise their potential, determine their goals, construct their intellectual identities, make autonomous decisions, and take responsibility for the knowledge they produce. It is within this framework that the concept of self actualisation acquires renewed relevance. Self actualisation can no longer be understood merely as the realisation of individual potential; rather, it needs to be situated within a learning ecology in which human agency continuously interacts with intelligent systems.

The urgency of this reconstruction is further reinforced by empirical evidence demonstrating the ambivalent nature of AI. On the one hand, the fulfilment of psychological needs for autonomy, competence, and relatedness in AI-based environments is associated with creativity and motivation (Singh & Aziz, 2025). AI chatbots can also support self-regulated learning through the fulfilment of learners' needs for autonomy and competence (Xia et al., 2023). Other research indicates that GenAI support for psychological needs can enhance motivation for independent reading (Pan et al., 2025). Thus, AI has the potential to serve as a cognitive scaffold that expands opportunities for learners' self actualisation.

This potential, however, is accompanied by significant risks. Excessive use of AI may shift cognitive activities from learners to AI systems, such that increased efficiency comes at the cost of reduced cognitive engagement. Research on cognitive offloading indicates that more extensive use of GenAI does not in itself generate cognitive benefits; learning motivation and patterns of human-AI collaboration determine whether such use preserves cognitive autonomy (Si et al., 2026). The medical education literature similarly emphasises that GenAI can function as a cognitive enhancer when accompanied by critical evaluation and human oversight, but may reduce autonomy when it replaces learners' own reasoning (Izquierdo-Condoy et al., 2025).

At this point, an important research gap emerges that warrants further investigation. The literature on AI in education has largely examined AI through the lenses of effectiveness, technology acceptance, motivation, academic performance, AI literacy, or self-regulated learning. The literature on self actualisation, meanwhile, historically developed from humanistic psychology at a time when algorithmic agents had not yet become an intrinsic part of learning activities. Recent studies have begun to connect reflection, Self-Determination Theory (SDT), and professional actualisation (Marchi & Paganotti, 2025); however, the systematic integration of self actualisation, learner agency, psychological need fulfilment, reflexivity, AI literacy, and human-AI collaboration still requires further conceptual development. In other words, the issue is not simply whether AI improves learning outcomes, but how human self-actualisation should be redefined when some cognitive activities can be distributed to machines.

This issue has global relevance, as many higher education institutions face the challenge of integrating AI without compromising human dimensions such as creativity, critical reasoning, wisdom, responsibility, and the capacity of learners to determine the direction of their own learning. The AI-Augmented Heutagogy framework, for example, positions AI as a means of supporting learner-determined, or self-determined, learning and emphasises that AI's computational

capabilities should complement human emotional and ethical dimensions (Ng & Lai, 2025). This perspective represents a shift in AI based education from technology centred education towards human centred AI education.

Against this background, the novelty of this study lies in reconstructing self actualisation as reflective relational self actualisation within an AI learning ecology. Self actualisation is conceptualised not as a hierarchical and individual endpoint, but as a dynamic process through which learners maintain and expand their agency across seven interconnected dimensions: autonomy, competence, relatedness, epistemic agency, metacognitive reflexivity, creativity, and ethical responsibility. AI is positioned as a cognitive-relational scaffold rather than as a substitute for the learner as an active subject.

This study therefore aims to: (1) analyse the transformation of the meaning of self actualisation in AI based learning environments; (2) identify the psychological, pedagogical, cognitive, and ethical conditions under which AI may strengthen or, conversely, hinder self actualisation; and (3) formulate a conceptual framework for self actualisation that is relevant to human AI learning ecologies. Theoretically, the study seeks to bridge humanistic psychology with motivation theory, learner agency, and AI based education; practically, its findings may provide a foundation for educators and institutions to design uses of AI that enhance human capacities.

2. METHODS

This study employs a qualitative library research approach using an integrative literature review design. The integrative approach was selected because the aim of the study is not merely to map the frequency of empirical findings, but to undertake a conceptual synthesis of literature drawn from several theoretical traditions, namely humanistic psychology and self actualisation, Self Determination Theory (SDT), Self Regulated Learning and Self Determined Learning, Learner Agency, AI literacy, and AI in education. Scholarly literature is treated as a unit of data for identifying conceptual relationships, theoretical tensions, continuities of ideas, and possibilities for reconstructing the concept of self actualisation within AI mediated learning environments. Recent empirical literature concerning learners' experiences of using AI is also examined to assess the coherence between the theoretical reconstruction and emerging empirical developments.

The analysis was conducted using Qualitative Content Analysis through several stages. First, the literature was identified and selected according to its relevance to four main domains: self-actualisation and human development, psychological needs and motivation, agency and self-regulation, and human AI interaction in education. Second, the texts were analysed through Conceptual Coding to identify themes such as autonomy, competence, relatedness, creativity, reflection, epistemic agency, cognitive offloading, AI dependence, and ethical responsibility. Third, these categories were compared using Constant Comparative Analysis to identify patterns of convergence and contradiction. The final stage involved Conceptual Synthesis, in which the identified categories were integrated into a reconstructive framework of self actualisation within AI based learning ecologies.

The trustworthiness of the conceptual interpretation was maintained through source triangulation and comparison across theoretical perspectives. Literature highlighting the benefits of AI was compared with literature emphasising the risks of dependence and diminished agency. This strategy was employed to avoid technological determinism, whether in the form of excessive optimism or pessimism, thereby ensuring that the conceptual reconstruction was grounded in the principle that the impact of AI on self actualisation depends on pedagogical design, learner characteristics, levels of AI literacy, forms of human AI interaction, and users' reflective capacities..

3. FINDINGS AND DISCUSSION

3.1. Self Actualisation from a Humanistic Perspective

Self actualisation is a central pillar of humanistic psychology, which emphasises the potential for growth, meaning making, autonomy, and the capacity for continuous development through experience, freedom, creativity, and openness to growth (Alkhasanah et al., 2022). In the educational context, this orientation shifts learners from being objects to becoming subjects of development, such that learning becomes a process of self-formation encompassing identity, creativity, responsibility, and the capacity to derive meaning from learning experiences. The classical paradigm of self actualisation was developed within an epistemic environment that preceded the emergence of GenAI (Generative AI), which now facilitates information retrieval, synthesis, argumentation, and even creative activities through human machine collaboration. This condition necessitates a reconstruction of the concept of self actualisation from an exclusively individual focus towards a form of actualisation embedded within human technology relationships, with an emphasis on collaboration, ethics, and continuous meaning-making (Wardani et al., 2022). In education, this transformation calls for a form of pedagogical pragmatism that evaluates not only academic outcomes but also learners' capacity for self actualisation across disciplinary, cultural, and technological contexts. Modern humanistic models of education emphasise learning that humanises learners (student-centred learning), responds to individual needs, interests, and potential, and positions self-actualisation as a broader educational goal extending beyond the mere mastery of subject matter (Ni'mah, 2021).

With the emergence of AI, self actualisation can no longer be adequately understood in isolation from technology; rather, it needs to be situated within a symbiotic relationship between humans and AI that enables the enhancement of cognitive capacities alongside ethical awareness and social responsibility in teaching and learning practices (Ariputra et al., 2022).

The dialogue between humanism and technology points towards an educational framework that integrates humanistic values autonomy, empathy, creativity, and meaning in life with digital literacy, AI ethics, and the capacity to collaborate with machines. Several studies highlight the importance of curriculum design that integrates spirituality, ethics, and technology-based learning to facilitate meaningful self actualisation in the AI era (Luthfiyah & Lhobir, 2023). At the practical level, the role of educators as agents who shape relationships, not only with learners but also with technological ecosystems, becomes crucial. Educators need to develop Pedagogical Competence 4.0, which combines pedagogical competence with the proportionate use of technology to enhance learning effectiveness in the Industry 4.0 era (Kareli & Utomo, 2023)..

3.2. Self Determination Theory as a Conceptual Bridge

Self Determination Theory (SDT) provides a conceptual foundation for understanding the psychological conditions that enable self-actualisation within learning contexts. The three basic psychological needs autonomy, competence, and relatedness can be understood as universal foundations that mediate how learning environments facilitate intrinsic motivation and optimal cognitive development (Bergeron et al., 2022). In AI based learning, these dimensions take on new forms through interface design, adaptive responses, and the dynamics of human machine interaction, which directly influence perceptions of autonomy, feelings of competence, and a sense of relatedness to fellow learners and educators. Synergy among these three needs in AI based learning design that is, a balance between autonomy, competence, and relatedness is necessary to facilitate intrinsic motivation and optimal development. SDT proposes that the fulfilment of these three needs is mutually reinforcing: when autonomy is supported, perceived competence can be strengthened through relevant feedback, while social relatedness reinforces learning identity and commitment to the learning process (Beaudoin et al., 2022).

Educational autonomy does not simply mean having the freedom to use AI, but rather the capacity to determine when, for what purposes, and to what extent AI should be employed in

the teaching and learning process. Within this framework, competence is not merely the ability to generate AI outputs; it also encompasses the capacity to understand problems, evaluate AI-generated outputs, and take control of the process when the system produces errors. Relatedness in learning cannot be entirely replaced by interaction with chatbots; the social context of learning remains necessary for creativity, collaboration, and the formation of professional identity, as illustrated, for example, by novice teachers who critically integrate AI into their practice (Celdrán, 2026).

Recent empirical evidence from 2025–2026 further confirms that, despite the increasing integration of Generative Artificial Intelligence (GenAI) into learning processes, teacher support remains fundamental and irreplaceable (Y. Li & Chiu, 2025). Although GenAI has the potential to expand autonomy and strengthen learners' perceptions of competence, the technology is not yet fully capable of satisfying the dimension of social relatedness, which constitutes one of the basic psychological needs in learning. The RAPID framework illustrates how the teacher's role as a critical curator and learning designer is integrated through the prompt pedagógico model (ROL, Audiencia, Parámetros, Información, Defensa/Revisión), thereby ensuring that teachers are not replaced by machines (Nascimento, 2026). Other studies similarly highlight the need for andamiaje ético (ethical scaffolding or an ethical support framework), teacher training, and instructional design that supports personalised learning without compromising human agency and interaction (Celdrán, 2026). Teachers' involvement as facilitators, assessors, and those responsible for ethical oversight remains central to the responsible use of GenAI (García-Díaz, 2026).

Empirical findings support the relevance of SDT in the context of AI by demonstrating that autonomy, competence, and relatedness mediated through intelligent learning assistants are positively associated with creativity, while self-regulation plays an important role in the development of AI literacy. More specifically, autonomy enables learners to make relevant learning choices, enhances intrinsic motivation, and stimulates creative exploration when interacting with AI assistants. Competence encompasses a sense of effectiveness in addressing challenges, whereby high-quality feedback and tasks adapted by AI assistants strengthen self-confidence and encourage experimentation with new ideas. Relatedness, as a social need, mediates the role of AI in expanding networks of ideas, classroom collaboration, and social support, thereby enabling creativity to develop collaboratively (Singh & Aziz, 2025).

The fulfilment of the needs for autonomy, competence, and relatedness can activate self-regulation strategies encompassing cognitive engagement, metacognitive knowledge, resource management, and motivational beliefs, which in turn contribute to enhanced AI literacy. The development of AI literacy is therefore not merely a process of acquiring technological competence; rather, it results from the dynamic interaction between the fulfilment of learners' psychological needs and their capacity for self-regulation in managing AI-assisted learning processes (K. Wang et al., 2025).

3.3. Self Regulated Learning, Heutagogy, and Learner Agency

Self actualisation in the AI era requires learner autonomy through self regulated learning (SRL), which involves goal setting, strategy selection, progress monitoring, information evaluation, and reflection on learning outcomes. When AI can provide answers at high speed, SRL becomes a crucial mechanism for ensuring that learning remains meaningful, adaptive, and sustainable. Learners need to direct their learning processes towards clear goals, employ appropriate strategies, critically evaluate AI generated information, and systematically reflect on their progress to support long-term self-development. SRL emphasises three recurring phases: planning (forethought), implementation (performance), and reflection (self reflection).

These phases enable learners to develop autonomy, maintain motivation, and dynamically adjust their learning strategies within AI-supported ecosystems, ensuring that learning does not merely involve reproducing rapid answers but instead transforms information into critically evaluated and personally meaningful knowledge (Siregar et al., 2024).

Studies examining the role of AI, chatbots, and intelligent tutoring systems in promoting self-regulation and metacognition emphasise that AI should function as a support rather than a replacement for internal cognitive processes such as planning, monitoring, and evaluation, thereby ensuring that SRL remains a core mechanism for learners' self-development (Shen et al., 2026). Recent studies further indicate that AI, when used as a self-regulatory scaffold, can strengthen SRL through the fulfilment of autonomy and competence. In chatbot-assisted learning, the needs for autonomy and competence mediate the enhancement of SRL within an SDT framework adapted to the context of AI in education (Z. Li & Yang, 2025). GenAI used as a reading companion can enhance autonomous motivation and independent learning through structured personalised interaction (Pan et al., 2025). Literature reviews also indicate that GenAI chatbots can enhance autonomy, motivation, and independent learning, particularly when interactions are designed to satisfy basic psychological needs (BPN) and are accompanied by support from teachers or mediators who maintain the quality of learning tasks (K. Wang et al., 2025). Nevertheless, thematic variations and risks such as dependence and threats to academic integrity have also been identified, highlighting the need for contextually appropriate scaffolding designs (Udo et al., 2026).

This concept is further extended through heutagogy, a learning paradigm that positions learners as the primary agents in determining their learning goals, strategies, resources, and evaluation. Within the framework of AI and augmented heutagogy, artificial intelligence functions as a cognitive partner that provides personalisation, adaptive feedback, and alternative learning pathways without taking over learners' autonomy (Ng & Lai, 2025). Therefore, self-actualisation in AI-based learning should not be measured solely by the intensity of technology use or proficiency in prompt construction. Rather, self-actualisation is reflected in learners' capacity to determine their own direction, critically evaluate algorithmic outputs, reflect on their experiences, make ethical decisions, and consciously use AI to develop their personal capacities on an ongoing basis.

3.4. AI as a Cognitive Scaffold and the Risk of Cognitive Offloading

From a cognitive scaffold perspective, AI does not merely replace intellectual work but functions as a support mechanism that organises information, models thinking processes, and provides adaptive feedback. By taking over preliminary searches, summarisation, and repetitive tasks, AI can free mental resources for deeper reasoning, evaluation, synthesis, and complex problem-solving (J. Wang & Fan, 2025). This expansion of cognitive capacity strengthens self-actualisation when users retain epistemic agency by setting goals, questioning AI-generated outputs, verifying evidence, and integrating insights reflectively. Rapid access to dialogue, alternative simulations, and personalised feedback broadens opportunities for exploration and creativity; however, these benefits require pedagogical designs that prevent dependence and the weakening of critical thinking (Lee et al., 2025).

AI assisted mechanisms become problematic when cognitive offloading ceases to function as a strategy for efficiency and instead becomes the relinquishment of the processes of understanding, evaluation, and decision-making. Offloading that occurs before learners have constructed a representation of the problem, tested assumptions, and developed their own

reasoning may inhibit the intellectual practice required for the development of critical thinking. The findings of Si et al. (2026) demonstrate that these effects are heterogeneous, with different patterns of human AI collaboration associated with varying levels of critical-thinking gains and the relinquishment of cognitive autonomy. In this relationship, learning motivation becomes an important predictor because it encourages learners to remain engaged, scrutinise AI-generated outputs, and independently maintain epistemic control over their learning processes.

The principal issue, therefore, is not merely the frequency of GenAI use but the distribution of cognitive labour between learners and technology. When AI-generated outputs are accepted as final answers without verification, argumentation, or reflection, technological convenience can foster passivity, dependence, an illusion of competence, and the erosion of independent reasoning. Conversely, the findings of Izquierdo-Condoy et al. (2025) emphasise that GenAI has the potential to support critical thinking when positioned as a dialogic partner rather than a substitute for reasoning. Its integration should therefore be structured around analytical questioning, evidence evaluation, comparison of alternatives, bias examination, and justification of decisions. Such pedagogical design ensures that AI expands thinking capacities while preserving learners' agency, intellectual responsibility, and cognitive autonomy over time.

The integration of artificial intelligence into education presents a paradox of augmentation and substitution, whereby the same technology can both expand and potentially diminish learners' capacity for self-actualisation. In its augmentative function, AI acts as a cognitive scaffold that broadens access to information, provides feedback, reduces non-essential cognitive load, and enables learners to allocate mental resources to higher-order thinking activities. In this configuration, AI strengthens agency, reflection, creativity, and problem solving capacities (Hong et al., 2025). Conversely, when AI shifts from being a supportive instrument to becoming a substitute for thinking processes, technological efficiency may result in cognitive offloading that reduces intellectual engagement, deep processing, and cognitive autonomy (Zhu et al., 2026). Thus, the fundamental issue is not simply the intensity of AI use, but the pedagogical architecture governing its appropriate use: whether AI expands human thinking capacities or instead takes over cognitive activities that learners need to experience and perform themselves as part of their development, so that competence, agency, and the capacity for self-actualisation can be sustainably cultivated (Alubthane, 2026).

3.5. Theoretical Framework for the Reconstruction of Self Actualisation

The Reflective Relational Self Actualisation Framework in AI Learning Ecologies (RRSA-AILE) is based on the premise that learners' self actualisation within AI mediated learning ecologies cannot be reduced to the ability to use technology effectively or to achieve learning outcomes more efficiently. Self-actualisation needs to be understood as a process of developing human capacities through dynamic relationships among individuals, artificial intelligence, pedagogical environments, and knowledge communities. From this perspective, AI is not merely an external instrument that accelerates cognitive activities but becomes part of a relational environment that can influence how learners think, make decisions, construct knowledge, and understand themselves as active subjects of learning.

Conceptually, RRSA-AILE proposes the following developmental pathway:

AI Affordances → Psychological Need Satisfaction → Human-AI Learning Agency → Reflective/Metacognitive Processing → Creative-Ethical Knowledge Construction → Reflective Relational Self Actualisation.

This sequence is not intended to represent a deterministic or linear relationship, but rather a developmental mechanism that is dynamic, recursive, and contextual. AI affordances, such as personalisation, interactive dialogue, immediate feedback, exploration of alternatives, and problem-solving support, acquire pedagogical value only when their use supports learners' psychological needs while simultaneously preserving their capacity to direct their own learning processes. Recent literature indicates that the educational consequences of GenAI depend substantially on how the technology is pedagogically integrated: scaffolding and augmentative uses tend to be more compatible with strengthening agency than substitutive uses (G. Wang et al., 2026). Accordingly, the relationships within RRSA-AILE should be understood as being moderated by AI literacy, pedagogical design, teacher support, the intensity and form of cognitive offloading, and ethical governance.

The framework comprises seven dimensions. First, autonomy: learners have the capacity to determine their learning goals and strategies, as well as the boundaries of AI use. Second, competence: learners are able to address problems while also understanding, verifying, and evaluating AI-generated outputs.

Third, relatedness: AI does not eliminate human relationships but is instead used to enrich learners' interactions with teachers, peers, and knowledge communities. Fourth, epistemic agency: learners retain the authority to ask questions, evaluate evidence, construct arguments, and take responsibility for knowledge claims. Fifth, metacognitive reflexivity: learners are able to recognise how AI influences their ways of thinking and determine which cognitive functions may appropriately be delegated and which should continue to be performed independently. Sixth, generative creativity: AI is used to expand possibilities for generating ideas rather than replacing the human capacity for creation. Findings concerning intelligent learning assistants indicate that the fulfilment of autonomy, competence, and relatedness can support university students' creativity (Singh & Aziz, 2025). Seventh, ethical responsibility: learners assume responsibility for the decisions, processes, and intellectual products created with the assistance of AI.

Within this conceptualisation, self-actualisation can be defined as a dynamic process of developing human capacities through a critical, reflective, creative, and ethical relationship with AI, while humans retain epistemic agency and ultimate responsibility for both the processes and products of learning.

DISCUSSION

The findings of this review indicate that self actualisation in the context of education based on Generative Artificial Intelligence (GenAI) can no longer be adequately understood solely as the realisation of individual potential. Self-actualisation needs to be situated within a broader relationship among learners, technology, educators, and the social learning environment. This finding extends the humanistic perspective, which traditionally places human beings at the centre of development, towards a perspective that continues to preserve human centrality while recognising AI as part of an ecology that influences the development of human capacities. Self-actualisation in the AI era is determined not by how extensively learners use technology, but by the extent to which technology is used to strengthen autonomy, competence, creativity, reflection, and

the capacity to construct meaning through learning. This shift is important because GenAI can transform learners from mere recipients of information into individuals who actively interact with intelligent systems to seek, develop, test, and revise knowledge. However, access to AI does not automatically lead to self actualisation. Self actualisation can develop only when learners retain control over the goals and processes of their learning. Recent research indicates that the use of GenAI in ways that support perceived autonomy, competence, and relatedness is associated with more autonomous forms of motivation and higher levels of learning engagement (Ahmed & Sultan, 2026). This suggests that technology acquires humanistic value not because of its sophistication in itself, but because of its capacity to create conditions that enable human development. Self actualisation in the GenAI era should therefore be understood as human development through AI, rather than human replacement by AI. AI can expand human capacities when learners remain in control of their intellectual activities. Findings concerning university students who shifted from being passive users to becoming designers of GenAI tools, for example, demonstrate enhanced experiences of autonomy, competence, relatedness with peers, and the formation of identities as co-creators of knowledge (Huang et al., 2025). Self actualisation is therefore more appropriately understood as the capacity to use AI consciously to expand one's possibilities without relinquishing human authority over the learning process.

The findings of this review indicate that Self Determination Theory (SDT) can serve as a conceptual bridge for explaining how the use of AI contributes to self actualisation. The three basic psychological needs autonomy, competence, and relatedness constitute conditions that determine whether AI facilitates empowering learning or instead encourages dependence. Autonomy cannot be understood merely as freedom to access AI. Rather, autonomy means that learners retain control over determining their goals, deciding when AI is required, assessing the relevance of its outputs, and determining which aspects of cognitive processing should not be delegated to technology. Recent empirical findings reinforce this conceptualisation. A study involving 297 university students found that perceived autonomy, competence, and relatedness contributed to autonomous motivation in the use of GenAI, which was subsequently associated with students' motivation and engagement (Ahmed & Sultan, 2026). Another study involving university students learning about AI similarly demonstrated that competence satisfaction constitutes a particularly important component of the motivational structure underlying AI learning (J.-J. Li et al., 2025). These findings suggest that AI integration should focus not only on technological availability, but also on creating learning experiences in which learners feel capable, experience meaningful choice, and remain socially connected. The dimension of relatedness is particularly important because AI cannot yet fully replace the relational functions of human interaction. A systematic review of 30 empirical studies examining GenAI in language learning found that GenAI provides relatively strong support for autonomy and competence, but does not yet fully satisfy the need for relatedness (Lin et al., 2025). This means that personalisation and instantaneous AI responses are not equivalent to authentic social connectedness. Teacher learner and peer-to-peer interactions remain necessary as spaces for dialogue, social validation, identity formation, empathy, and responsibility. At the same time, fulfilment of these three psychological needs is also associated with creativity. A study involving 304 university students found that autonomy, competence, and relatedness facilitated by intelligent learning assistants were positively associated with students' creativity (Singh & Aziz, 2025). These findings reinforce the conclusion that creativity within AI based self actualisation is not simply the capacity to generate numerous ideas with machine assistance, but rather learners' ability to use AI support to explore new possibilities while retaining ownership of their creative processes.

The findings further indicate that self actualisation in the AI era requires strong self regulated learning (SRL). When AI can provide information, explanations, summaries, and even solutions within a very short period of time, the learning challenge shifts from obtaining information to

regulating how that information is acquired, examined, understood, and used. Consequently, the processes of planning, monitoring, evaluation, and reflection become increasingly important. Empirical evidence from 2025 supports this argument. An experiment involving university students demonstrated that metacognitive support within GenAI environments enhanced SRL abilities, particularly in task completion strategies and self evaluation. Learners who used GenAI without metacognitive support were at risk of experiencing a decline in their level of self-regulation (Xu et al., 2025). A scientometric review of GenAI and SRL similarly identified the importance of metacognitive scaffolds, transparency for developing critical AI literacy, and assessment practices that evaluate learners' capacity to regulate their use of AI (K. Wang et al., 2025). From a heutagogical perspective, these conditions reinforce the need to move learners from being mere AI users towards becoming self determined learners. Learners need not only to master prompting techniques but also to be able to determine what they need to learn, select appropriate strategies, identify limitations in their own knowledge, use AI selectively, and evaluate the resulting outputs. Learner agency is therefore a more relevant indicator of self actualisation than the intensity of AI use. A 2026 scoping review of 123 studies reinforces this interpretation by identifying two patterns of GenAI use. Agency supportive patterns were associated with SRL, self efficacy, feedback literacy, and reflective engagement, whereas agency eroding patterns were associated with cognitive offloading, dependence, uncritical acceptance of AI outputs, and weakened independent judgement (W. Wang, 2026). Accordingly, AI based learning should not merely ask whether students are capable of using AI, but whether, after using AI, they become increasingly capable of directing and taking responsibility for their own learning.

One of the key findings is the existence of an augmentation substitution paradox. AI can function as a cognitive scaffold when it helps reduce less essential cognitive activities, thereby allowing learners to allocate greater mental resources to analysis, evaluation, synthesis, creativity, and problem-solving. However, the same technology can become a cognitive substitute when learners delegate the processes of understanding, reasoning, evaluation, and decision making to AI. Empirical evidence suggests that cognitive offloading is not inherently negative. Experimental research on writing instruction found that when lower-level tasks were delegated to GenAI in a structured manner and students were still required to engage in critique, revision, and reflection, the AI assisted learning group demonstrated greater improvements in critical thinking (Hong et al., 2025). Cognitive delegation can therefore be productive when the mental resources it releases are reinvested in higher-order thinking activities. Cognitive offloading, however, becomes problematic when AI takes over activities that learners themselves need to perform in order to develop competence. A 2026 study identified different profiles of GenAI use and demonstrated that the extent of cognitive offloading was associated with the relinquishment of cognitive autonomy; learning motivation emerged as an important predictor of both improvements in critical thinking and lower levels of such relinquishment (Si et al., 2026). Another study found that students who frequently relied on AI for writing produced more fluent and better organised texts, but demonstrated lower levels of originality and argumentation than students who used AI selectively (Tekir, 2026). These findings clarify that the central pedagogical issue is not whether AI should or should not be used, but rather which cognitive functions should be delegated to AI and which should remain under human control. Recent pedagogical frameworks therefore recommend positioning AI as a temporary thinking partner, accompanied by the evaluation of AI-generated outputs, the preservation of cognitive friction, metacognitive reflection, and a combination of AI assisted and AI free activities (Vendrell & Johnston, 2026). Through such an approach, the efficiency generated by AI does not come at the expense of depth of thought.

Based on the synthesis of the findings, the Reflective Relational Self Actualisation Framework in AI Learning Ecologies (RRSA-AILE) can be understood as an attempt to integrate humanism,

SDT, SRL, learner agency, and the issue of cognitive offloading into a unified developmental mechanism. The framework proposed in this study presents the following pathway:

AI Affordances → *Psychological Need Satisfaction* → *Human-AI Learning Agency* → *Reflective/Metacognitive Processing* → *Creative-Ethical Knowledge Construction* → *Reflective-Relational Self Actualisation*. This relationship is supported by the literature published in 2025–2026, although this does not imply that the entire RRSA-AILE pathway has been empirically tested as a single model. AI affordances in the form of personalisation, feedback, and interactivity can support the needs for autonomy and competence, whereas the dimension of relatedness requires stronger human involvement (Hsia et al., 2025). The fulfilment of psychological needs is subsequently associated with motivation and engagement (Ahmed & Sultan, 2026), while metacognitive support helps maintain self-regulation when learners work with GenAI (Xu et al., 2025). The seven dimensions of RRSA-AILE autonomy, competence, relatedness, epistemic agency, metacognitive reflexivity, generative creativity, and ethical responsibility can be understood as interconnected dimensions. Autonomy ensures that learners determine their own direction; competence enables them to use and evaluate AI; relatedness preserves the social dimension of learning; epistemic agency maintains human authority over knowledge claims; metacognition regulates the process of cognitive delegation; generative creativity directs AI towards expanding possibilities for creation; and ethical responsibility ensures that humans remain accountable for final decisions. These dimensions collectively demonstrate the principal contribution of the RRSA-AILE framework. Self-actualisation in the AI era is not a condition in which learners are simply able to accomplish more because they are assisted by AI. Rather, it occurs when AI assistance enables learners to become increasingly capable of determining their own goals, thinking and making judgements independently, creating, reflecting, relating to others, and taking responsibility for the knowledge they produce. Therefore, the success of GenAI based education cannot be adequately assessed solely through efficiency, output quality, or proficiency in prompt engineering; it must also be assessed in terms of education's capacity to preserve and expand human agency. Overall, the findings of this study point towards one central proposition: GenAI supports self actualisation when it functions as an augmentative technology that strengthens psychological needs, self regulation, metacognition, creativity, and epistemic agency; conversely, GenAI may hinder self actualisation when it becomes a substitutive technology that replaces learners' processes of thinking, reflection, decision-making, and responsibility. Recent findings concerning SRL, SDT, learner agency, and cognitive offloading provide a reasonably consistent empirical basis for this line of argument, although the RRSA-AILE model as a whole still requires further empirical testing (Vendrell & Johnston, 2026).

4. CONCLUSION

Self actualisation in learning in the era of Generative Artificial Intelligence (GenAI) needs to be reconstructed from a concept oriented towards the realisation of individual potential into a process of human development that is relational, reflective, and situated within a learning ecology involving learners, educators, technology, and the social environment. Self actualisation is determined not by the intensity of AI use, but by the extent to which AI strengthens learners' autonomy, competence, relatedness, creativity, reflection, and capacity to construct and take responsibility for knowledge.

Self Determination Theory (SDT) provides a psychological foundation for explaining this process through the fulfilment of the needs for autonomy, competence, and relatedness. GenAI can support autonomy and competence through personalisation, feedback, and easier access to information; however, the need for relatedness continues to require authentic human interaction. Therefore, the role of educators and interactions among learners remain essential components of AI-

based learning, particularly in fostering dialogue, empathy, identity formation, social validation, and responsibility.

Self actualisation also requires strong self-regulated learning, a heutagogical approach, and learner agency. Learners need to be able to determine their learning goals, select appropriate strategies, monitor the learning process, evaluate AI-generated outputs, and reflect on the decisions they make. Technical proficiency in using AI, including prompt engineering, is not in itself sufficient to demonstrate self actualisation. A more important indicator is learners' capacity to remain the directors and owners of their own learning processes.

The use of GenAI also presents a paradox between cognitive scaffolding and cognitive offloading. AI can serve as a means of cognitive augmentation when it is used to reduce the burden of lower-level activities, thereby enabling learners to allocate their mental capacities to analysis, evaluation, synthesis, creativity, and problem-solving. Conversely, AI may become a form of cognitive substitution when the processes of understanding, reasoning, evaluating, decision-making, and reflecting on knowledge are delegated to technology. Thus, the central issue is not whether AI is used, but rather which cognitive functions are delegated to AI and which remain the responsibility of humans.

The Reflective Relational Self Actualisation Framework in AI Learning Ecologies (RRSA-AILE) integrates seven key dimensions: autonomy, competence, relatedness, epistemic agency, metacognitive reflexivity, generative creativity, and ethical responsibility. These seven dimensions position learners as the primary agents who use AI consciously and selectively to expand their capacities without relinquishing authority over their thinking processes, knowledge, and decisions to technology..

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